

## NEW OR RARE FISHES FROM MAROUBRA, N.S.W.

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(Plate xvii.)

All the following fishes have been obtained at Maroubra Bay, and by my colleague Mr. Thomas Whitelegge unless otherwise stated.

Maroubra is situated between Port Jackson and Botany Bay, and is a deep inlet about one and a half miles across; it is bounded on both sides by low cliffs, at the bases of which are numerous rock-pools, the home of many small blennies, gobies, and other littoral fishes; these also occasionally detain fishes not usually found in such localities. Stretching between the rocks is an area of sand, on to which, more especially after heavy seas, many other forms are to be met with; frequently those small pelagic species unable to withstand the tempestuous waters when driven near the land. It is to be further remarked that only during winds from seaward are such fishes to be found on the coast. It is almost useless, on the shores of this colony, to attempt much shore work during or immediately after a westerly wind, and this leads us to a further consideration as to how pelagic fishes become stranded. It can scarcely be considered likely that the wind actually drives them in, but it probably has, indirectly, much to do with it.

A large amount of information may be obtained by observing the invertebrate life on the coasts under varying atmospheric conditions. Easterly winds drive in small Pteropods, Medusæ,

Salpæ, and other pelagic forms, and it is to be noticed that they are frequently accompanied by the smaller crustaceans, such as Amphipods and Copepods, which are also sought after as food by fishes.

Such immense shoals of almost invisible invertebrates have probably a great bearing on the situation of fishes directly or indirectly accompanying them, and cause them to change their position much as do swallows when hawking for flies, which, as is a well-known fact, accommodate their movements to the varying pressure of the atmosphere. This simile is by no means strained, for, as Dr. Francis Day remarks (*Food of Fishes*, p. 17):—"The mackerel, it has been observed, swim higher or lower in the water in accordance with atmospheric vicissitudes, most probably due to the influence of such upon the food they subsist upon."

The occurrence of an influx of pelagic life upon the coasts may be assumed by noticing the behaviour of the gulls and other sea birds. At such times they flock upon the shore and eagerly watch the edge of the water, where they secure not only the fry of our valuable edible fishes but doubtless also a large proportion of the smaller organisms which bring the fish to the coasts and within easy reach of the fishing community.

Seagulls are protected by law and no one would desire that these beautiful ornaments to our coasts should be banished. It will be well for those who have charge of the fishing interests of the colony to see that these birds are not permitted to become so numerous as to interfere with our future fish-supply. I have endeavoured to show that fish are largely attracted coastwise by the food to be found there, and if we permit the birds to consume such food-supply the fish will seek other feeding grounds. Thither the fishermen will have to follow them at much loss of time and without the possibility of bringing them to market in such a fresh condition. This may be but a small factor towards the depletion of the coast, yet we should be fully alive to the truth that it is a *possible* factor. It may be long ere this state of things can arise

here, but surely we should take warning from what has occurred in England and zealously guard not only our present but our future fish-supply also.

Of the fishes hereafter mentioned one is described as new and the others are more or less worthy of remark as being either new to the fauna of Australia, or of exceedingly rare occurrence.

#### DULES ARGENTEUS, Bennett.

Although recorded from several of the Polynesian islands, this species has not been previously identified from the mainland of Australia.

Numbers of these fishes may be observed almost any time at Bondi and Maroubra, and are probably to be met with all along the coast in suitable localities, but owing to their seclusive habits have hitherto been overlooked.

In a collection of fishes recently brought from Lord Howe Island by Mr. T. R. Icely, the Visiting Magistrate, is one of this species, an addition to the published fauna of that island; although in 1887 small fishes were seen there (but not obtained) by members of Mr. Etheridge's party, since recognised as of this species.

I have myself seen them on the coast where they may generally be observed in rock-pools. They are extremely shy and wary, and usually live under boulders, whence they may be enticed by throwing in morsels of food. From the circumstance of their thus hiding themselves they may be regarded as shore-loving fishes; the truly pelagic forms when cast into rock-pools do not appear to have the idea of thus secreting themselves, but rush wildly about when alarmed.

#### ACANTHURUS TRIOSTEGUS, Linn.

Gunther remarks (*Fische der Südsee*, p. 109):—"This species is common throughout the whole of the Indian Ocean and the South Seas as far as the Sandwich Isles." He further says:—"Throughout Polynesia it is called 'Manini'." Macleay, giving

the locality of the type of *Teuthis australis*, Gray, includes it in his "Catalogue of Australian Fishes" (p. 161) as from the west coast of Australia. It is also recorded as far south as New Zealand, and I now include it as a member of the fauna of New South Wales, an example having been obtained at Maroubra by Mr. Whitelegge, who observed it swimming in a rock-pool and obtained it by baling out the water.

PSENES WHITELEGGII, sp.nov.

(Pl. xvii. fig. 1.)

B. vi., D.  $11\frac{1}{19}$ , A.  $\frac{3}{18}$ , V.  $\frac{1}{5}$ , P. 18, C. 18, L. lat. 55. Length of head 3·6, of caudal 4—4·48, height of body 3·24 in the total length. Diameter of eye 2·9 in length of head, half a diameter from the end of snout and less than a diameter apart. Dorsal profile elevated and bulging above the nostrils. Abdominal profile not so convex, body compressed, jaws equal, maxilla reaching to just within the anterior margin of the eye. Teeth in a single series, small, palate toothless, preopercle and opercle scaly.

The dorsal fin commences above the hinder edge of the opercle, 3rd and 4th spines longest and equal, nearly half the length of the head and higher than the soft dorsal, to which the anal is similar both as to relative position and extent. Pectorals long, reaching slightly beyond the anal and as long as the head, less the snout. Ventrals reach slightly beyond the vent. Caudal deeply forked.

Scales cycloid, moderate, and adherent. Lateral line continuous following the dorsal curvature as far as the 48th pore, where it bends horizontally to the caudal. A second and very distinct line, but without pores, runs straight from the opercle to the caudal.

Ground colour delicate salmon, crossed by 3 brownish transverse bands, the first very broad, extending from the head to the vent; the second much narrower, connecting the dorsal and anal rays, and the third narrow, at the base of the caudal: these bands are not equally defined in all the examples. Above the head brown;

beneath, including opercles, silvery ; fins brownish. Several examples were washed on to the beach at Maroubra alive and obtained by Mr. Whitelegge. The largest specimens are equal in size and measure 47 mm. in length.

Type in the Australian Museum ; registered number I. 3297.

#### NOMEUS GRONOVII, Gm.

Respecting the distribution of *N. gronovii* Günther writes :—"Tropical parts of the Atlantic. The species appears to inhabit also the Indian Ocean and the coasts of Australia." Macleay, writing without further evidence, suggests Western Australia as its habitat. It is now possible to give one definite locality of its occurrence on Australian coasts. From Feb. 25th to March 5th last, living examples were being constantly washed up on to the beach at Maroubra, and during this period Mr. Whitelegge obtained several specimens.

#### SCHEDOPHILUS MACULATUS, Günther.

Up to September last, when Mr. Ogilby wrote his review of the genus *Schedophilus* (Records, Australian Museum, II. p. 65), only one example of *S. maculatus* had been obtained from the coast of this colony. In December last Mr. A. M. Lea brought us a small fish from Maroubra, which we identified as a second example, and later in the same month a third specimen was brought from Lord Howe Island by Mr. Icely, together with the *Dules argenteus* already mentioned, and as with that species is a new record to the known pisci-fauna of the island.

#### GLYPHIDODON BROWNRIGGII, Bennett.

This very variable little species, which appears to be scattered through the seas between Ceylon and the Sandwich Islands, has not, so far as I am aware, been recorded further south than Fiji or the New Hebrides. I am, however, able to record it from

Australian coasts, two examples having been seen alive at Maroubra, one of which was obtained. The colours were brilliant, an orange-coloured ground with brilliant blue longitudinal streak; the head was also lined with blue. The presence of two spots, a large one at the posterior base of the dorsal fin and a smaller one occupying a similar position in relation to the soft dorsal, would point to its being of the variety described as *G. antjerius*, C. & V.

On showing the above note to Mr. J. D. Ogilby, he told me that some years ago Dr. James C. Cox had presented a small *Glyphidodon* to the Museum. In consequence I searched the registers, and found that it was obtained in Port Jackson in 1888, and had been named *G. antjerius*. Further search showed that specimens of *Glyphidodon* were brought from Lord Howe Island in the following year, and are without doubt referable to this species.

#### SOLENOGNATHUS, Swainson.

(Pl. xvii. figs. 2-11.)

Several fresh specimens of *Solenognathus* having been recently presented to the Museum, and knowing that all the examples in the galleries were named *S. spinosissimus*, Günth., I was led to re-examine those exhibited, and found that they were readily divisible, a certain number being referable to the very well marked species, *S. hardwickii*, Gray. Of the remainder I made an examination to decide whether they should be called *S. spinosissimus* or *S. fasciatus*, Günth. According to the published descriptions, the latter differs from the earlier described species in having 41 dorsal rays instead of only 35, a somewhat wider forehead, the trunk ornamented with seven blackish cross-bars, and in the preanal region being blackish.

The number of dorsal rays in the specimens of *S. spinosissimus* at my disposal is by no means constant, individuals possessing 35, 36, 37, 38, and 39 rays.

Having named his second species *S. fasciatus*, Dr. Günther seems to have considered the colour markings as peculiar to the

species, but I may remark that in all fresh specimens of *S. spinosissimus* which I have seen, the seven cross-bars are a most noticeable feature, and even in a dry state are frequently to be traced by a darkening of the dorsal tubercles where the bars existed. The inferior portion of the two preanal rings is very bright orange during life, but becomes blackish after death.

If adequately described the claims of *S. fasciatus* to be a distinct species appear to be somewhat slight. Of the other species, a few remarks based on recent observations may be of some interest.

#### SOLENOGNATHUS HARDWICKII, Gray.

(Pl. XVII. figs. 2-4 and 7.)

D. 43-45. Osseous rings 26-28 + 55-60. Dorsal surface concave or flat. Forehead convex or flat. Occipital scute simple, or but slightly compound generally forming one large median, and two smaller lateral lobes. Scutes rugose, but with scarcely any spines. The lateral row of scutes does not terminate at the end of the dorsal fin, but is to be traced to the extremity of the tail. Length 17 inches and beyond.\*

When referring to the *Solenognathus* in general, Günther writes:—†“All the specimens in the British Museum are unfortunately dried, so that the sexes cannot be ascertained; but although some of them must be of the male sex, there is no trace of a pouch or other receptacle for the ova.”

As I have not access to Marenzen's paper on the sexual characteristics of the Syngnathi,‡ or any other paper dealing with the subject, I write the following at the risk of having been anticipated.

In the species under consideration, the sexes are remarkably distinct, as least in the adults. The tail of the male is greatly

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\* Günther says that *S. hardwickii* attains a length of nearly two feet. “Study of Fishes,” p. 682.

† Brit. Mus. Cat. of Fishes, viii. p. 195.

‡ Sitzungsb. der Natur. Gesel. “Isis,” 1872, p. 1

expanded from its commencement at the vent to the termination of the dorsal fin, the expansion gradually disappearing at the following third or fourth scute. The lateral row of scales on each side of the tail constitute the expanded edges, these edges are bent downward, and form the boundaries to two inferior shallow grooves separated by a flat portion of equal breadth. The whole of the under surface of the tail thus occupied—about fifteen scutes—although bearing traces of tubercles, is covered with a smooth skin, which, in the breeding season, becomes flaccid and to which the ova are attached.

The tail of the female bears no trace of the lateral expansion so noticeable in the male, and the scutes of its lower surface are as rough and rugose as any other portion of the body. In the adult the body proper is relatively longer and deeper than in the male.

This species was originally described from China, but there are examples in the British Museum from Houtman's Abrolhos, a group of islands off Western Australia. Examples in the Australian Museum were labelled "*Solenognathus spinosissimus*, Port Jackson," and Mr. Whitelegge has obtained specimens at Maroubra Bay. These appear to be the only other localities whence it has been obtained, and it is now recorded for the first time from New South Wales. If the specimens of this family preserved in the museums of other Australian colonies were examined, I have no doubt our knowledge of its distribution would be considerably extended.

*SOLENOGNATHUS SPINOSISSIMUS*, Günther.

(Pl. xvii. figs 5 and 8.)

D. 35-39. Osseous rings 27 + 55. Dorsal surface convex. Forehead concave. Occipital scute in the form of a rosette consisting of a median lobe surrounded by 6-8 smaller ones. All parts\* covered with very distinct spines, a stronger one arising

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\* With the exception of the inferior basal portion of the tail of the male and the prehensile portion in all species.



from the centre of each tubercle. The lateral row of scutes is not continued to the extremity of the tail, as such, but passes upward and merges into the upper row at the end of the dorsal fin. Length 16 inches.

I have not noticed any important structural differences in the sexes, beyond the fact that the female has a relatively longer body than the male, and has the lower surface of the tail spiny as in other parts.

Some little time ago Mr. Whitelegge obtained a fresh male at Maroubra, with six or seven ova adhering; they were unfortunately lost before I had an opportunity of seeing them, but the mode of attachment and the area occupied were very apparent. Counting along the inferior surface the non-spiny portion extends from the vent to the fifteenth scute. Along the sides the lateral row forms the upper boundary as far as the eleventh scute, thence to the fifteenth scute the boundary is the series which there becomes the lateral row of the tail. The area thus restricted is covered with a smooth skin. During the breeding season it becomes flaccid and thrown into ridges, forming shallow pits. Into each pit an ovum is placed and no doubt glued into position with some viscid secretion. It occurred to me that this skin might be but the remnants of an egg-case, but as all the male specimens in the Museum, both dry and in spirits, possess it, and as it is scarcely likely that they were all taken during the breeding season, I am led to consider it as part of the animal. The fact of the ova-bearing male above referred to having been taken on March 4th would appear to indicate autumn as the spawning season.

Günther described this species from Tasmania; Klünzinger records it from Port Philip, Victoria; and we have it from Wollongong, thence from various places to Port Jackson, where several examples have been obtained at odd times.

*MONACANTHUS FILICAUDA*, Günther.

As far as I am aware, this species has not been recorded since originally described\* from the South of New Guinea in the Arafura Sea. From January to March last small numbers were to be met with at Maroubra; many of them were living, but all appeared to have been injured, and being thus unable to withstand the heavy surfs, were washed on to the sandy beach. The black spot below the dorsal fin is, as Günther observes, a constant feature.

*MONACANTHUS NITENS*, Hollard.

Mr. Whitelegge has been fortunate in securing a second member of this genus, which, so far as I can ascertain from the literature at my disposal, has not been found since 1854, when it was first described and figured.† Hollard appears to have considered that the single specimen described might be miniature and possibly the young of a previously described species, but as our example seems to agree with it in all particulars, there can be little doubt that it is an adult form, and therefore quite distinct. Our example was obtained at Maroubra during the present month (May), and as it is probably only the second specimen ever obtained it will be well to describe it.

D. 30. A. 26. P. 12. C. 12. Length of head (to gill opening) 3·3, of caudal 5·2, height of body 2·5 in the total length.

Eyes 3·6 in the length of the head, barely a diameter apart and 2·6 from the end of the snout. Gill opening but little oblique, beneath the posterior margin of the orbit and distant from the centre of the eye one diameter.

Upper and lower profile of snout concave, back between the spine and the fin straight and horizontal. The spine arises immediately over the centre of the eye, is moderately strong and very slightly curved backwards; it is long and equals its distance from the end of the snout. The barbs are in two lateral series pointing

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\* Challenger Shore Fishes, p. 50, pl. XXIII. f. D.

† Ann. des Sci. Nat. 4<sup>me</sup>Série, Tom. ii. p. 364, pl. 14, f. 12 (f. 4 in text).

outward and downward. Toward the base they are opposite, but gradually lose this position and become alternate. Anteriorly the spine is provided with minute barbs having an upward aspect excepting towards the apex, where they are much larger and have their points directed downward.

The dorsal fin arises exactly at the point reached by the spine when depressed into its groove ; it is low, the seventh ray longest. Anal similar to the dorsal. Ventral spine large, its apex jointed : towards the hinder margin of the fixed portion are two strong barbs on both sides, united at their bases, having their hooked points directed upwards and backwards ; four precisely similar barbs on the movable portion having a slightly less upward aspect. At the base of the spine are four barbs pointing upward, the remaining portion studded with smaller barbs.

The pectorals arise directly behind the gill openings and are 1·7 in the length of the head ; the caudal rounded.

The scales are small and from each arises a short obtuse spine, some of which are bifurcate or even trifurcate from the base.

The name *nitens* is most felicitous, for the greater part of the body has the appearance of being silvered. The dorsal edge is olive and the portion between the snout and the ventral spine is closely spotted. Vertical and pectoral fins immaculate, caudal with four delicate brownish transverse bars.

Total length of the specimen 46 millim.

#### LEPTOCEPHALUS, Bonaparte.

Until quite recently none of the forms described under this name have, I believe, been met with in Australian waters. Dr. Haast records *L. longirostris*, Kaup, from the coast of New Zealand, as the only one ever obtained in that colony. On March 18th last Mr. Whitelegge secured a living example at Maroubra, and only two months later Mr. Frank Middleton brought us a second specimen from Dee Why, north of Port Jackson. Both were transparent when alive, and could barely be distinguished

when in water. They became opaque, however, on being placed into weak spirits.

Owing to the still uncertain nature of these remarkable forms, I have not attempted any critical examination of them; I may merely mention that in neither specimen is there trace of pectoral fins. In the one from Maroubra the height is contained about 18 times in the length and the tail is not produced. In the other one the height is contained 14 times in the length and the tail is tapering and pointed.

The following extract from the "Study of Fishes" will be read with interest by those who have not access to Dr. Günther's work.

"Taking into account all the various facts mentioned, we must come to the conclusion that the Leptocephalids are the offspring of various kinds of marine fishes, representing, not a normal stage of development (larvæ), but an arrest of development at a very early period of their life; they continue to grow to a certain size without corresponding development of their internal organs, and perish without having attained the characters of the perfect animal. The cause by which this abnormal condition is brought about is not known; but it is quite within the limits of probability that fishes usually spawning in the vicinity of land sometimes spawn in the open ocean, or that floating spawn is carried by currents to a great distance from land; and that such embryos, which for their normal growth require the conditions afforded by the vicinity of the shore, if hatched in mid-ocean, grow into undeveloped hydroptic creatures, such as the Leptocephales seem to be" (p. 181).

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*Postscript.*—Since the paper was read I have, through the kindness of Prof. David, had the opportunity of examining three specimens of *Solenognathus* preserved in the Macleay Museum at the Sydney University. These differ somewhat from *S. spinosissimus* and are without doubt referable to *S. fasciatus*. Günther writes of it\*:—"This species is most closely allied to *Solenognathus*

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\* Challenger Shore Fishes, p. 30.

*spinosissimus*, having the same rough and spiny scutes." It is, however, the nature of these scutes that at once showed me the specimens were distinct, and wherein I perceive the readiest means of distinguishing the species. It may be characterised as follows:—

*SOLENOGNATHUS FASCIATUS*, Günther.

(Pl. xvii. figs. 6 and 9.)

D. 39-41. Osseous rings 27 + 55. Dorsal surface slightly convex. Forehead concave. Occipital scute trilobed, each lobe being of nearly equal size. Tubercles not conspicuously raised; from each rises a comparatively prominent and stout spine, the rest of the surface covered with spines so minute as to be scarcely noticed without a lens. The lateral row of scutes as in *S. spinosissimus*. Length, 13 inches.

I have purposely avoided giving particulars of colouration, but have pointed out such characters as will enable anyone to determine the three species either from dry or spirit specimens.

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EXPLANATION OF PLATE XVII.

- Fig. 1.—*Psenes whiteleggii*. (Enlarged).  
Fig. 2.—*Solenognathus hardwickii*. Male; basal portion of tail.  
Fig. 3.—*Solenognathus hardwickii*. Seen from beneath.  
Fig. 4.—*Solenognathus hardwickii*. Female.  
Fig. 5.—*Solenognathus spinosissimus*. Male.  
Fig. 6.—*Solenognathus fasciatus*. Female.  
Fig. 7.—*Solenognathus hardwickii*. Outline of dorsal scutes (magnified).  
Fig. 8.—*Solenognathus spinosissimus*. Outline of dorsal scutes (magnified).  
Fig. 9.—*Solenognathus fasciatus*. Outline of dorsal scutes (magnified).